UNITED STATES PATENT AND TRADEMARK OFFICE

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EXAMINER
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ART UNIT	PAPER NUMBER
2621	

DATE MAILED: 01/30/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *10 April 2001*.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-12* is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-12* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *10 April 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

13)☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

    a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.

4)☐ Interview Summary (PTO-413) Paper No(s). _____.

5)☐ Notice of Informal Patent Application (PTO-152)

6)☐ Other: .

DETAILED ACTION

Claim Rejections - 35 USC § 112

1.   The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2.   Claims 3 and 6 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for

failing to particularly point out and distinctly claim the subject matter which applicant regards as the

invention.

3.   Claim 3 recites the limitation "the length" in line 2 of claim 3. There is insufficient antecedent

basis for this limitation in the claim.

4.   Claim 6 recites the limitation "the algebraic expression" in lines 1-2 of claim 6. There is

insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

5.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the

basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6.   Claims 1-4 and 8 are rejected under 35 U.S.C. 102(b) as being anticipated by

Kayikcioglu et al. (hereinafter, "Kayikcioglu") ("Unique Determination of Shape and Area of Coronary

Arterial Cross-Section from Biplane Angiograms," IEEE, 1992).

With regard to **claim 1** Kayikcioglu discloses a method for processing an initial image of

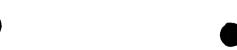coronary arteries (page 597 lines 4-7), the initial image given by an intensity function $I(x,y)$ defined on a

set of pixels (x,y) (the intensity function f(x,y) as equation 2 on page 598 and Figure 2 shows the image

from two image planes from two x-ray sources), so as to produce a processed image of the coronary

arteries (process image are seen in Figs. 5 a-c) having an intensity function I'(x,y) (the observed

intensity distribution (i.e., an intensity function) in two image planes seen in Figure 2 are given by

equation 5 on top of page 599), comprising steps of: (a) obtaining a function z(x,y) describing a heart

surface over the initial image (heart surface is described by x-y plane (first and second axis being "x"

and "y") as seen in equation 1 on page 598. Introducing an another axes labeled by "p" and "u" seen in

equation 3 and 4 as the line integral along "u" axis representing the third axis (i.e., "z") to determine the

depth by use of the angle ϕ); and (b) calculating the intensity function I' based upon the function z (the

intensity function as seen in equation 2 on page 598 and also the observed intensity distribution in the

two image planes shown in Figure 2 are given by equation 5 on page 599).

With regard to **claim 2** Kayikcioglu discloses the method according to claim 1, wherein the

function z(x,y) describes an ellipsoidal surface over the initial image (it is clear from his invention that

an ellipsoidal surface is being described. See, page 597, Figure 1 lines 6-7 under "Methodology").

With regard to **claim 3** Kayikcioglu discloses the method according to claim 2 wherein the

ellipsoidal surface has a first Axis (x-axis) and a second axis (y-axis) coinciding with the length and

width, respectively (as seen in Figure 2 on page 598), of the heart in the initial image, and a third axis

perpendicular to the image (this axis is in/out of the page, See, page 597 assumption (1) under

"Methodology" lines 2-4).

With regard to **claim 4** Kayikcioglu discloses the method according to claim 3 wherein the third

axis has a predetermined constant times the length of the first or second axis (P1max and P2max, See,

page 601).

Claim 8 is rejected the same as claim 1. Thus, arguments similar to that presented above for

claim 1 is equally applicable to claim 8. Claim 8 distinguishes from claim 1 only in that it recites first

digital image and second digital images. Kayikcioglu discloses first and a second digital images as seen

in Figures 1 and 2 as image one and two from x-ray source 1 and x-ray source 2.

Claim Rejections - 35 USC § 103

7.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness

rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102
> of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject
> matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art
> to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8.   Claims 5 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kayikcioglu.

With regard to **claims 5** Kayikcioglu discloses P1max and P2max as seen in table 1 on page 601.

Kayikcioglu does not expressly disclose the predetermined constant to be from about 0.3 to about 0.8

times the length of the first axis. It would have been obvious matter of design choice to modify

Kayikcioglu's invention by having range limits for the predetermined constant, since applicants have not

disclosed that having the predetermined constant to be from about 0.3 to about 0.8 times the length of

the first axis solves any stated problem or is for any particular purpose and it appears that having these

ranges for predetermined constant would perform equally in Kayikcioglu's invention.

With regard to **claim 7** is rejected for the same reasons as claim 7 and therefore, the arguments

are not repeated here.

9.   Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kayikcioglu in view of

Umetani et al. (hereinafter, "Umetani") (US 4,890,310).

With regard to **claim 9** Kayikcioglu discloses two x-ray sources with two image planes with two

images being taken of the coronary artery. This invention is a step towards three dimensional

reconstructions of coronary arterial trees as disclosed on page 596 under "Introduction" lines 5-6.

Kayikcioglu does not expressly disclose presenting the first and second processed images for

stereoscopic viewing. Umetani discloses presenting the first and second processed images for

stereoscopic viewing (Seem col. 5 lines 27-36). Kayikcioglu and Umetani are combinable because they

are from the same field of endeavor, i.e., imaging objects (such as blood vessels and coronary artery,

col. 5 lines 17-27, Umetani). At the time of the invention, it would have been obvious to a person of

ordinary skill in the art to combine the teaching of Umetani with Kayikcioglu. The motivation for doing

so is that the stereo imaging, which provides depth information, makes easy the distinction of the

coronary artery. It also can distinguish the orientations of the respective branches of the coronary artery,

thus accurately finding the location of a pathological change as suggested by Umetani. Therefore, it

would have been obvious to combine Umetani with Kayikcioglu to obtain the invention as specified in

claim 9.

10.   Claims 10-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kayikcioglu in

view of Chen et al. (hereinafter, "Chen") (US 6,047,080).

With regard to **claims 10-12,** Kayikcioglu discloses all of the claimed subject matter as already

discussed above in claim 1 the arguments are not repeated herein, but are incorporated by reference.

Claims 10-12 distinguish from claim 1 only in that it recites a computer program/storage device.

Kayikcioglu discloses computing information from the computer generated data under "Abstract" on

page 596 lines 6-11. However, Chen specifically discloses an appendix including a source code (See,

col. 20 lines 32-36). It would have been obvious to a person of ordinary skill in the art to have the

program code of Chen's included in the Kayikcioglu's invention since Kayikcioglu mentions of using

the computer generated data.

Conclusion

11.   The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

US 6,377,835 and US 5,872,861.

Any inquiry concerning this communication or earlier communications from the examiner

should be directed to Shefali D Patel whose telephone number is 703-306-4182. The examiner can

normally be reached on M-F 8:30am - 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Leo

H Boudreau can be reached on 703-305-4706. The fax phone number for the organization where this

application or proceeding is assigned is 703-872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should

be directed to the receptionist whose telephone number is 703-306-0377.

DANIEL MARIAM
PRIMARY EXAMINER

Shefali D Patel
Examiner
Art Unit 2621

January 22, 2004